

## CLAIMS

What is claimed is:

1. An x-ray source comprising:

an electron-generation chamber including an electron beam source;

a target chamber including a support structure and a target positioned within the support structure, the emitted electrons traveling in a direction substantially parallel to a longitudinal axis extending between the electron-generation chamber and the target chamber towards the target and bombarding the target to generate x-rays, the target being movable, while being bombarded with electrons, with respect to the support structure in at least one direction substantially perpendicular to the longitudinal axis; and

a flexible sealing member that couples the electron-generation chamber and the target chamber, the interior of the electron-generation chamber and the target chamber being sealed from ambient contaminants.

2. The x-ray source of claim 1 further comprising a target locator coupled to the target and adapted to move the target in the at least one direction perpendicular to the longitudinal axis.

3. The x-ray source of claim 2 further comprising a second target locator coupled to the target to move the target in at least a second direction substantially perpendicular to the longitudinal axis and orthogonal to the first direction.
4. The x-ray source of claim 1 further comprising a plate and an elastic member coupled to the plate, the elastic member and plate being positioned between the target and the support structure.
5. The x-ray source of claim 1 further comprising at least one exit aperture, a portion of the x-rays emitted from the target passing through the aperture.
6. The x-ray source of claim 1 wherein the target defines a planar surface substantially perpendicular to the longitudinal axis.
7. The x-ray source of claim 1 wherein the target defines a substantially planar surface tilted at an angle such the planar surface is non-orthogonal to the longitudinal axis.
8. The x-ray source of claim 7 further comprising a target locator coupled to the target and adapted to move the target in the at least first direction perpendicular to the longitudinal axis.

9. The x-ray source of claim 8 further comprising a second target locator coupled to the target to move the target in at least a second direction substantially parallel to the planar surface.
10. The x-ray source of claim 1 further comprising a focusing optic which focuses the electron beam, the focusing optic being selected from the group consisting of a magnetic focusing optic, an electrostatic focusing optic, or a combination of magnetic and electrostatic focusing optics.
11. An x-ray source comprising:
- an electron-generation chamber including an electron beam source which emits electrons;
  - a target chamber including a target and a support structure, the support structure defining a lower surface and an upper surface, the target being movable within an interior region of the support structure in at least one direction perpendicular to a longitudinal axis extending between the electron-generation chamber and the target chamber, the emitted electrons traveling in a direction substantially parallel to the longitudinal axis towards the target and bombarding the target to generate x-rays;
  - a flexible sealing member mounted on the lower surface and coupling the electron-generation chamber and the target chamber; and

at least one target locator coupled to the target and adapted to move the target in the at least one direction perpendicular to the longitudinal axis while the target is being bombarded with electrons.

12. The x-ray source of claim 11 further comprising a plate and an elastic member coupled to the plate, the elastic member and plate being positioned between the target and the support structure.
13. The x-ray source of claim 11 further comprising an exit aperture, a portion of the x-rays emitted from the target passing through the aperture.
14. The x-ray source of claim 11 wherein the target defines a substantially planar surface tilted at an angle such that the planar surface is non-orthogonal to the longitudinal axis.
15. The x-ray source of claim 14 further comprising a second target locator coupled to the target and adapted to move the target in a direction substantially parallel to the planar surface.
16. The x-ray source of claim 11 further comprising a focusing optic which focuses the electron beam, the focusing optic being selected from the group consisting of a magnetic focusing optic, an electrostatic focusing optic, or a combination of magnetic and electrostatic focusing optics.